22 September 2025

Ms Christina Smits
Fast-track Approvals
TTR Taranaki VTM Project FTAA-2504-1048
[redacted]
Substantive@fasttrack.govt.nz

Dear Christina

Taranaki VTM Project Fast-track Approval Application FTAA-2504-1048
Minute 4 of the Expert Panel
Additional Information Provided by the Applicant

Minute 4 of the Expert Panel dated 19 September 2025 requested [7] the applicant provide the following document:

Humpheson D (2017) Trans-Tasman Resources – Acoustic Modelling: Unpublished report to TTR.

Please find attached the Humpheson D (2017) report as requested.

Yours sincerely
Trans-Tasman Resources Limited

Alan J Eggers
Executive Chairman

Attached: Humpheson D (2017) Trans-Tasman Resources – Acoustic Modelling

AECOM

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2 May 2017

Dr Simon Childerhouse
Senior Marine Scientist
Blue Planet Marine

Dear Simon

Trans-Tasman Resources - Acoustic Modelling

1.0 Executive Summary

I, Mr Darran Humpheson, Associate Director of Acoustics at AECOM, have been instructed by Trans-Tasman Resource Limited to undertake an assessment of underwater noise levels from the iron sand extraction and processing application.

As part of my assessment I have considered the likely sources of noise associated with the project and undertaken a conservative assessment of underwater noise using the commercially available software package dBSea. Predicted noise levels have been produced using bathymetry and other data and the results analysed to determine the spatial extent of noise. The main observations are:

- Source levels have been based upon empirical data obtained from De Beers Marine (measured crawler and support vessel noise).
- Source levels are predominantly low frequency (less than 1,000 Hz) with a significant reduction in sound levels at frequencies greater than 8,000 to 10,000 Hz.
- Predictions have reflected the local circumstances within the South Taranaki Bight and are conservative in their findings.
- Receiver noise levels reduce rapidly at short distances and then there is a gradual reduction in sound levels due to the combined influence of shall water depth and sandy sediment seabed properties.
- At a distance of 500 m, receiver levels are predicted to reach 135 dB re 1µPa and 120 dB re 1µPa at 10 km.
- If the totality of noise is considered, i.e. the noise contribution of other support ships and dynamic positioning thrusters on-board the integrated mining vessel, then noise levels increase by approximately 8 dB, i.e. a level of 120 dB re 1µPa is achieved at approximately 23 km from the mining area.

2.0 Introduction

The Decision Making Committee issued a request (Minute number 41) for acoustic information as part of Trans-Tasman Resource Limited (TTRL) iron sand extraction and processing application. The relevant requirements are detailed at Appendix 3 of the request. This report addresses paragraphs 1 – 4, 7 and 8 of Appendix 3. The requests in paragraphs 5, 6 and 9 are outside the scope of this report and the professional expertise of the author.

This technical letter has been prepared to assist the DMC by Mr Darran Humpheson, Associate Director of Acoustics at AECOM. Mr Humpheson assisted the DMC in 2014 (and was the EPA underwater noise expert) and has since been commissioned by TTRL to provide acoustics assistance on matters of underwater sound sources and propagation. Additional information is also included to assist the evidence of Dr Simon Childerhouse, who is TTRL's marine mammal expert.

The relevant requirements of Appendix 3 are reproduced below (as noted, items in italics are outside the scope of this report):

1. Define all likely noise sources associated within the project, and incorporate them into an acoustic model.

2. Model the sound produced by the project, such that it reflects the physical characteristics of the site and wider STB (such as bathymetry), the nature of the project (such as sound duration and frequency), *and the potentially affected species*. It is expected that this modelling would not be based on a simple spherical approach.
3. Model and present data as background; project alone; and background plus project.
4. Provide a graphic (mapped) representation of sound levels within a 100km zone surrounding the project area, and at all depths within that zone [this has been prepared separately to this report].
5. *Integrate USA NOAA (National Oceanic and Atmospheric Administration) interim sound threshold guidance or other international guidance related to the use of marine acoustic models, with particular regard to parameters relevant to marine mammals (including cetaceans and seals).*
6. *Present draft findings to the marine mammals witness caucus and incorporate their feedback as appropriate.*
7. Review and comment on the noise related evidence of other parties, already provided to the DMC during the course of the hearing.
8. Provide the noise contours map as offered during questioning.
9. *Provide update of hearing ranges chart (Figure 1 and Table 1 in evidence) to include seals, as offered during questioning.*

This report also considers the relevance of different propagation algorithms used to calculate underwater noise levels at different depths and distances..

3.0 Noise sources

This section considers the DMC's paragraph 1 request for noise source information.

There are two reports[1,2] prepared for the De Beers' operation in Namibia, which I understand have already been made available to the DMC. These reports, although published in the 1990s, relate to off-shore diamond mining using similar technology to that proposed by TTRL, i.e. a sea bed crawler and support vessels. I consider that data to be particularly relevant in the current situation, because empirical data was measured and reported for a range of operating conditions.

The main noise sources associated with TTRL's mining activity are the crawler unit, which operates on the sea floor, the riser line from the crawler to the Integrated Mining Vessel (IMV) above and support vessels such as the bulk carrier and trans-shipment FSO. Each of these sources is discussed below.

3.1 Crawler

The TTRL crawler will have a number of primary individual noise sources:

- Hydraulic pump and system noise which would be typical of an industrial scale hydraulic pump and circuit. The frequency bandwidth of the system noise is relatively high as will be the magnitude of the noise in comparison to the remaining sources of noise.
- Pump induced noise, which is considered to be low in magnitude, will typically produce low to mid frequency noise. There will be mid to high frequency noise produced by particles impacting within the riser pipe. The magnitude of this noise is likely to be low given the small particle sizes that would be encountered by the proposed crawler.
- Movement and motor noise is likely to be very low due to the slow speed of the crawler (typically 0.04 kmh / ~1 cm per second).

[1] Institute for Maritime Technology, Environmental Impact Study, Underwater Radiated noise, TV0010-000003-730, 8 July 1994
[2] Institute for Maritime Technology, Environmental Impact Study, Underwater Radiated noise II, TV0010-950048-730, 23 March 1995

- There would also be induced noise from sonars on the crawler (as used for either positioning or visualisation), which would be similar to commercial systems used for underwater surveying. The sonars would produce high localised levels of noise typically at high frequencies (720 kHz), i.e. greater than the functional hearing range of most species. It is likely that the sonar would use 'soft start' to minimise the impact on nearby marine species.

The crawler will operate on the sea floor down to depths of 11 m below the original sea bed. Except for the noise radiated from the transport pipe, all noise sources are localised on the sea floor. Although there would be some shielding from the sides of the 'work trench', it will only be localised around the immediate work area.

Based upon information provided by De Beers it was agreed by the acoustic experts at the 2014 hearing that a likely source level for the crawler would be 172 dB re 1µPa at 1m. Within Mr Nevil Hegley's Summary of Evidence dated 29 March 2014, he provided an indicative crawler sound spectrum (Figure 1 of his Summary of Evidence). The spectrum, which is reproduced below, shows a spectrum shape dominated by low frequency sound below 30 Hz. Low frequency sound propagates more efficiently than much higher frequency sound and hence noise from the activity will be dominated by this low frequency component. I should note that the De Beers crawler extracts much larger sediment particles that the proposed TTRL operation and therefore adoption of the De Beers data would provide a conservative assessment of noise levels

The De Beers data is based upon measurements based on technology that is at least 22 years old. Technological improvements in pump design and acoustic control will, in my opinion, result in marginally lower source levels to those assumed in this assessment. It is likely that source levels would be 1-2 dB lower than the assumed 172 dB re 1µPa at 1m.

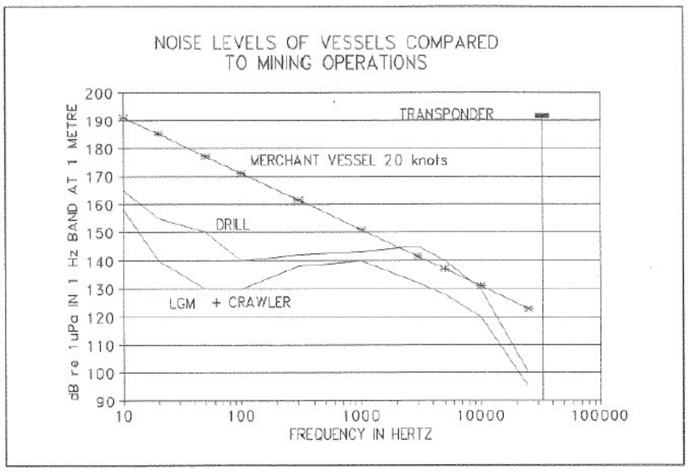


Figure 1. Crawler Sound Spectrum

Note – the data presented in this chart is for individual frequency bands and not octave band data used in the modelling assessment.

3.2 Integrated Mining Vessel

The IMV supports the extraction and processing of the iron sand, including dewatering and storage of the iron ore before being transferred to the bulk carrier. Whilst the vessel will be stationary above the crawler, the vessel will be producing noise from the processing plant and generators. A large moving ship will typically have a source level of 170 - 180 dB re 1µPa at 1m. It is considered that extraction and processing activities will generate a worst case sound pressure level similar to that of the crawler, i.e. ~170 dB re 1µPa. Again this source data is supported by the De Beers empirical data.

The IMV will also produce noise from the Dynamic Positioning System's thrusters. DPS thrusters will operate when the IMV is repositioned to allow the crawler to mine the extent of the next block or when sea state conditions necessitate the use of the DPS to maintain a static position. In normal circumstances the DPS will not operate and therefore thruster noise will not be additive to other extraction and processing noise from the IMV. There will be additive noise from the crawler and this cumulative noise is considered later in this report.

Measured DPS noise typically varies from 171-186 dB[3] re 1µPa at 1m, with the frequency content being low, i.e. 20-1,000 Hz. High frequency noise will only be generated if there is cavitation. Adverse cavitation from DPS thrusters is a result of poor inflow design. It will therefore be important to ensure that the IMV's DPS thrusters minimise cavitation.

3.3 Other sources

Other sources include the bulk carrier and trans-shipment floating storage and offloading (FSO) vessel. These vessels will not be permanently on site and accordingly only the combined effects of the crawler and IMV have been considered due to the 24/7 operations that will take place.

The combined effects of noise are such that the sound from the crawler and IMV will be additive but should be treated as separate sources since one operates on the sea floor and the other on the surface.

The following table and chart summarises the likely noise levels based on octave data from operating vessels and the De Beers measurements[4].

Table 1 Source levels (dB re 1µPa at 1m)

Name	Level	31.5	63	125	250	500	1k	2k	4k	8k	16k	32k
TTR crawler	171	161	168	163	160	158	154	142	136	134	130	128
IMV	171	170	164	143	144	138	133	129	120	100	-	-
IMV DPS	177	175	172	166	158	154	154	152	-	-	-	-
FSO	173	160	165	166	168	168	160	158	-	-	-	-

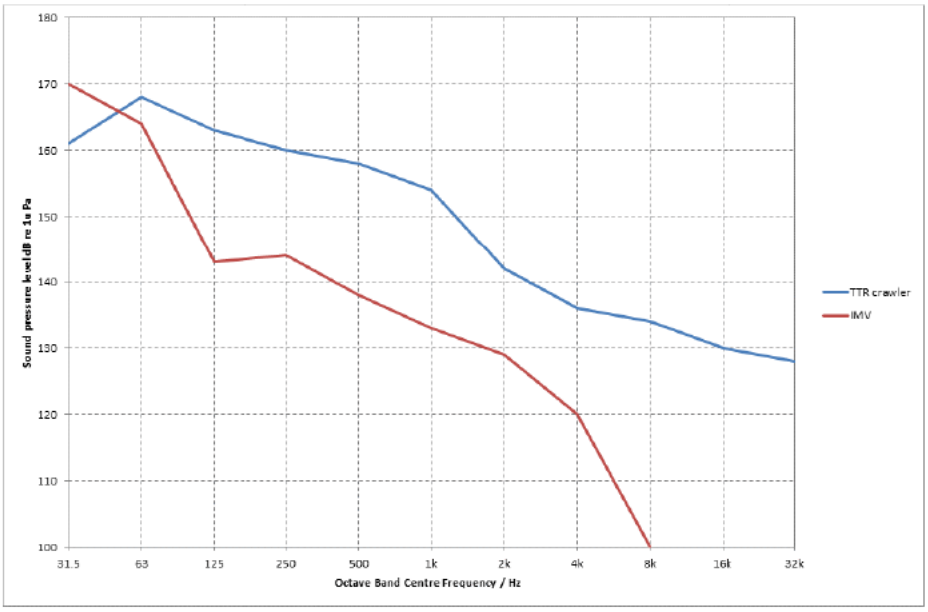


Figure 1 Frequency plot of Crawler and IMV source levels

All of the sources are low frequency and high frequency sound greater than 8,000 to 10,000 Hz is at least 25-30 dB lower than the frequencies below 1,000 Hz. This information is especially important when considering the aural effects of TTRL's operations on different marine species.

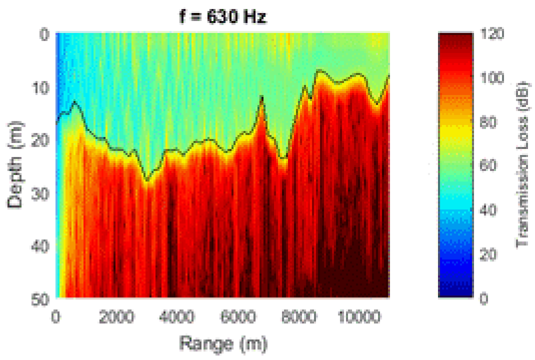
[3] http://cmst.curtin.edu.au/wp-content/uploads/sites/4/2016/05/erbe_2013_underwater_noise_from_offshore.pdf
[4] Extrapolated from information provided to the DMC in 2014 and adjusted to the assume overall sound pressure levels.

AECOM

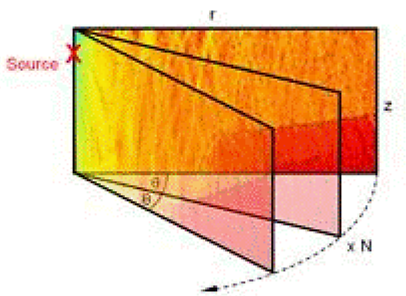
4.0 Underwater Noise Modelling

This section considers paragraphs 2, 3 and 8 of the DMC's request for representative noise modelling within the STB and noise level information.

Researchers have developed many different types of underwater propagation algorithms depending on such things as the frequency range of interest, seabed composition, depth, range and so on. Regardless of the algorithm of choice the most common modelling approach is to use the N x 2D technique, where the transmission loss (TL) is calculated in several (N) two-dimensional planes of depth versus range. The example image below shows an example of calculated TL in one plane, with the seabed shown by the black line. The method of calculating the TL varies depending upon the chosen calculation algorithm.



To create a 3D representation, these planes are arranged around the source radially, somewhat like this:



The N x 2D approach is only relevant for one particular frequency. For a broadband sound level, the individual frequencies would have to be summed and combined into a visual isopleth. The output of the N x 2D provides a quasi-three dimensional model of TL and resulting noise levels. There are some limitations compared to a "true" 3D model, such as accounting for noise diffraction around land masses. However for a relatively uniform sea bed of little variation in topology the N x 2D approach is appropriate.

Sea-floor bathymetry and non-uniform refraction/reflection in the seabed are important considerations in shallow water. Being simplistic, a 10xlog(r) cylindrical spreading model will typically provide a conservative estimate of TL if there are no significant seabed features that provide shielding. Typically a representative approximation often lies somewhere between idealised spherical and cylindrical spreading - 20log(r) and 10log(r), and can sometimes transition between the two idealised scenarios with complex seafloor conditions. There are also more complex algorithms available as discussed below.

AECOM has previously used the underwater acoustic propagation modelling toolbox provided by the Ocean Acoustics Library and a frontend provided by Curtin University (AcTUP V2.2L running under MATLAB) to produce N x 2D data. AECOM now uses the commercially available software program dBSea, which is able to generate 3D noise contours and individual noise levels at specific locations (range and depth) for a range of calculation algorithms and source types.

dBSea has a number of different calculation algorithms of differing complexity and conservatism:

- 20 log – TL is calculated based on simple geometric spreading, i.e. an inverse square law. The calculated attenuation is spherically symmetric and frequency independent. Bathymetry is ignored.
- 20log + 10 log - TL is calculated according to the 20 log (r/r0) inverse square law, until the distance from the source is greater than the water depth at the source. From this point, levels drop according to 10 log (r/rd), i.e. an inverse law. It is considered that the reflections from the seafloor and the sea surface constrain the sound energy within the water layer, and the problem becomes essentially 2-D, or similar to a vertical line source extending from the surface to the seafloor. The algorithm is axially symmetric and frequency independent. Bathymetry is ignored, with the exception of the aforementioned calculation based on the water depth at the source.
- dBSeaPE - parabolic equation method. The dBSeaPE solver utilises the so-called parabolic equation and is range-dependant, i.e. it takes variable bathymetry into account. dBSeaPE is suitable for low frequency problems. The input to the solver is configured so that the sediment layer is extended down to 2 times the depth of the water column, with the attenuation rapidly increasing at the lowest depths. The intention is to remove energy that would be reflected from the very bottom of the sediment layer.
- dBSeaModes - normal modes method. The normal modes are calculated for each water depth, based on the sediment properties and water sound speed profile. dBSeaModes is suitable where the frequency is low and/or the water depth is shallow. The sediment layer is extended down well below the depth of the water column, with the attenuation rapidly increasing at the lowest depths. In this way, there are no modes where energy is reflected from the very bottom of the sediment layer.
- dBSeaRay - ray tracing method. The ray solver forms a solution by tracing rays from the source out into the sound field. A large number of rays leave the source covering a range of angles, and the sound level at each point in the receiving field is calculated by summing the components from each individual ray. dBSeaRay is suitable for high frequency problems.
- dBSea user defined – a user defined equation can be used such as 15log r or similar relationship.

The appropriateness of each propagation model depends of factors such as frequency range, water depth, and computational power, amongst others. Complex models require substantial computing power and can take many hours (or even days) to run. Therefore a balance has to be sought based on the accuracy of the model and the available computing time.

The dBSea software takes into account the following factors:

- bathymetry data,
- sea floor properties – which in the case of the South Taranaki Bight (STB) is predominantly silty sands. Properties are the density, speed of sound and various attenuation factors.
- sound speed profile data in the water column – typically relevant for deep water propagation >250 m
- current and tide
- temperature and salinity

4.1 TTRL model

A 3D model of the proposed TTRL operation was constructed using the following data sources:

- 250 m resolution gridded bathymetry data[5] as available from NIWA. The data was imported in ArcMap and the coast line of New Zealand (source Linz) was combined to provide land features.
- Boundary of the permitted mining area – the dBSea model assumes that the activity is located centrally within the permit area.

5 https://www.niwa.co.nz/our-science/oceans/bathymetry/download-the-data?sid=13137

- Crawler sound source located at 38 m depth (water depth at point is 45 m) and IMV located at 5 m depth, which is approximately mid-depth for the overall draft of the IMV (~12 m). A sensitivity analysis of varying crawler depths has not been reported as there is a negligible effect on the resulting underwater sound levels (dBSea enables the variation of sound level with depth to be investigated and for depths of 40 m the receiver sound level variation is a maximum of +/- 2 dB).
- Sound sources assumed to operate continuously, i.e. 100% duty for both the crawler operating and the IMV processing but not using DPS (a sensitivity analysis of all sources operating has been undertaken).
- Linear sound speed profile – as the water depth is relatively shallow at around 20-50 m depth.
- Assume seabed of sand to a depth of 15 m.
- Negligible current and standard temperature and salinity profile for New Zealand waters as a neutral condition has been modelled to assess the long term effects of sound propagation. A sensitivity analysis has been performed for a current of 0.25 m/s.

A receiver location was positioned at 500 m from the IMV at a depth of 10 m to confirm compliance with the condition agreed in the 2014 hearing that required that noise from the combined effects of the noise from the crawler and IMV to achieve a sound pressure level of 135 dB re 1µPa RMS linear at a distance of 500 m from the operations. The condition also requires that within the bands of 10-100 Hz, 100-10kHz and >10kHz that the sound pressure level at 500 m does not exceed 130 dB re 1µPa RMS linear. Additional receivers at distances were also included to assess the spatial reduction.

I have assessed the complex propagation algorithms available within dBSea (dBSeaPE, dBSeaModes and dBSeaRay) and determined that the dBSeaModes solver provides the most conservative assessment in terms of receiver noise levels and the most appropriate solution for the local conditions of the STB. dBSeaModes takes into account the sandy sediments of the study area and is applicable for the project's low source frequencies and shallow water depth.

Predicted data is presented in Table 2 for close distances.

Table 2 Predicted levels at distance and source level at 500m

	500 m	1000 m	1500 m	2000 m	Source level to achieve 135 dB source level (dB re 1µPa at 1m)
Sound Pressure Level (dB re 1µPa)	135	130	129	128	171

A greater spatial analysis has been performed using a large study area to establish how underwater sound levels reduce with distance. Predictions have been performed up to a distance of 120 km from the source. There is a rapid drop off, due to the properties of the sea floor, followed by a more gradual reduction in the sound level with distance.

At a distance of approximately 10 km from the activities, receiver levels reduce to 120 dB re 1µPa.

Receiver levels reduce to just below 100 dB re 1µPa at just over 120 km from the activity.

The variation of sound pressure level with depth was also investigated with the dBSea software. Ten water depth profiles were assessed using the dBSeaModes algorithm. Whilst the data presented in this report is the maximum sound level across all depths (as projected on the surface of the water – see Map 1 appended to this report), the variation of sound level was found to be:

- at depths of approximately 40 m the sound pressure variation across all frequencies of interest was at most 3 dB.
- at depths of ~120 m, i.e. where noise levels are reduced to around 100-110 dB re 1µPa the variation with depth increased to approximately 3-6 dB.
- at greatest depths in the order of 200+ m, the variation increases to approximately 5-10 dB.

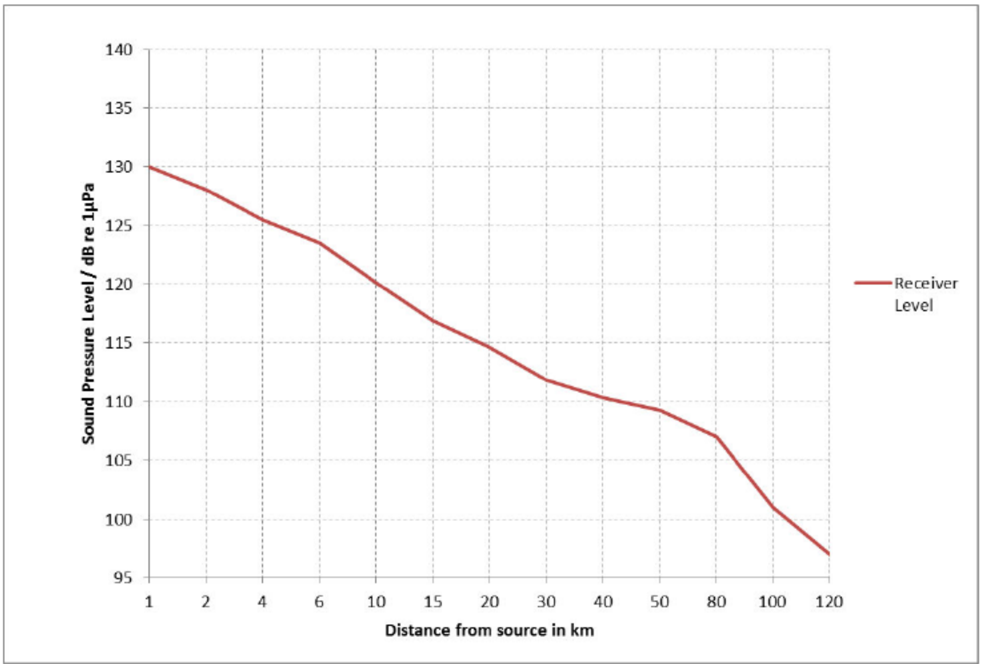


Figure 2 Sound level reduction with distance (dBSea Modes solver)

4.2 Sensitivity analysis

The sensitivity analysis assumes that in addition to the crawler and IMV operating, there is also noise generated by the DPS thrusters and the operation of the FSO under power. As noted earlier, DPS would only be used if the sea state is high to enable the IMV to remain on station.

Table 3 Predicted levels at distance - sensitivity analysis scenario

	500 m	1000 m	1500 m	2000 m
Sound Pressure Level (dB re 1µPa)	142	138	137	136

At a distance of approximately 23 km from the activities, receiver levels reduce to 120 dB re 1µPa.

Receiver levels reduce to just below 100 dB re 1µPa at just over 120 km from the activity.

In comparison to the data in Table 2, the sensitivity analysis shows that overall sound levels close to the source increase by 7-9 dB with the additional noise sources on the assumption that all sources are operating simultaneously and constantly. As already explained not all sources will be operating simultaneously and therefore the presented data can be considered an absolute worst case.

The effects of current have been investigated for the dBSeaModes solver for a 0.25 m/s favourable current in the direction of the measurement array. The effects are localised at the source and quickly reduce with distance. At source, the maximum variation is 0.2 dB which equalises with the neutral situation at a distance of 1 km from the activity.

4.3 Sound Exposure

Sound exposure calculations take into account the sound level of the noise in question and the receiving time. TTRL's operations are continuous (other than when the operations cease due to inclement weather) and therefore apart from IMV repositioning to a new 'block', the noise levels are representative of a 100% duty cycle. Table 4 provides an indication of how the sound exposure levels vary with both distance and exposure time based on the output of the dBSeaModes data (Table 2) and the above assumptions.

Table 4 Sound Exposure levels

Distance	Sound pressure Level dB re 1µPa	SEL dB re 1µPa^2.s				
		10 sec	10 min	1 hr	3 hr	24 hr
500 m	135	145	163	167	170	184
1000 m	130	140	157	162	165	179
1500 m	129	139	156	161	164	178
2000 m	128	138	155	160	163	177

5.0 Background level data

This section considers the DMC's paragraph 3 request for comparison to background data.

Ambient data has been acquired by JASCO [6] within the STB. The data was recorded over a seven month period from 4 Jun to 20 Dec 2016 at the NIWA Mooring 2 deployment site, which is approximately 80 km from the mining area. The report concluded that anthropogenic sources, i.e. vessel detections and seismic survey activity were the major contributors to the daily average noise level (L_{eq}). Frequency data was also recorded for the range 10-8,000 Hz, which corresponds to the main frequency bands of TTRL's operations (see Figure 1).

The L_{eq} metric can be used to assess the total average sound energy measured over a period of time. If the noise in question is constant then the L_{eq} will be similar to a sound level expressed as a RMS value. However if there are significant fluctuations in the measured sound levels then the L_{eq} will be greater than the RMS sound level. The median sound levels (L_{50}) represent typical ambient levels during the deployment period, whereas the L_5, whilst not the maximum, represents the typical higher sound levels experienced. Mean energy average L_{eq} values are also included.

Sound Level Metric	Sound Pressure Level			
	10–8,000 Hz	10–100 Hz	100–1,000 Hz	1,000–6,300 Hz
Minimum	87.1	79.9	83.9	72.6
L_{95}	97.2	90.4	92.3	83.0
L_{75}	102.3	96.9	97.3	91.1
L_{50}	105.6	102.0	100.1	95.2
L_{25}	110.9	109.5	102.6	97.9
L_5	126.2	126.2	106.0	102.0
Maximum	159.1	159.1	143.4	130.0
Mean (L_{eq})	120.4	120.2	103.2	97.6

The DMC requested that project data is combined with the background ambient data to produce "background plus project" noise. Whilst in theory this analysis can be undertaken, it is not common practice to combine background sound levels with receiver sound levels as the two sources of data are measured and assessed differently. Rather it is more appropriate to undertake an assessment of whether the background is able to mask the noise in question.

The TTRL data is presented as a constant sound level, which is equivalent to the L_{eq}. To show the extent of operational noise the project noise levels have been 'truncated' at 120 dB, which reflects the ambient noise environment. Within approximately 25 km from the activity, TTRL operations will be above the background sound levels as determined by the L_{eq} noise metric.

[6] McPherson, C. and J MacDonnell. 2017. Summary of Ambient Noise Within the South Taranaki Bight: Analysis of Mooring 2. Document 01351, Version 1.0. Technical report by JASCO Applied Sciences for NIWA.

Furthermore, a second truncation has been used based on the L_{95} data. This second comparison is representative of the quietest periods of monitoring (97 dB) and indicates where the activity is likely to be present during lulls in anthropogenic noise. From analysis of the data, TTRL operations will esonify an area of approximately 120 km before the quietest background level is achieved. To place this into context, a transiting container vessel, with a source level of 180 dB re 1µPa at 1m will in comparison, esonify an area of 160 km when background levels are at their lowest.

Depending upon the frequency content of the noise, noise levels below background and ambient noise levels may still be audible. Human subjects are typically able to discern sound levels 8-10 dB below a masking noise level if there are strong tonal elements to the character of the noise. The frequency chart (Figure 1) shows that the main frequencies are in the low to mid frequency range with a marked roll-off of sound levels greater than 10kHz and that there is no dominant frequency component. The 'truncated' charts are therefore an appropriate means of assessing the extent of TTRL's operations and there is unlikely to be significant 'audible' noise outside the truncated areas. These graphs are shown separately.

6.0 Noise Evidence

This section considers in part the DMC's paragraph 7 request for review and comment on the noise evidence of others.

I have reviewed the empirical source level data obtained from De Beers Marine (measured crawler noise) and I continue to support the use of this data, as was the case in the 2014 hearing. I have undertaken a conservative assessment of underwater noise using the commercially available dBSea software and used the most appropriate calculation algorithm applicable to the local conditions of the STB and those of the project.

I have reviewed the evidence of others and there are various comments made about noise and noise effects, much of it without reference to specific analysis and empirical data. I am satisfied that my assessment quantifies the issues they have raised and addresses the queries raised by the DMC.

Yours faithfully

Darran Humpheson
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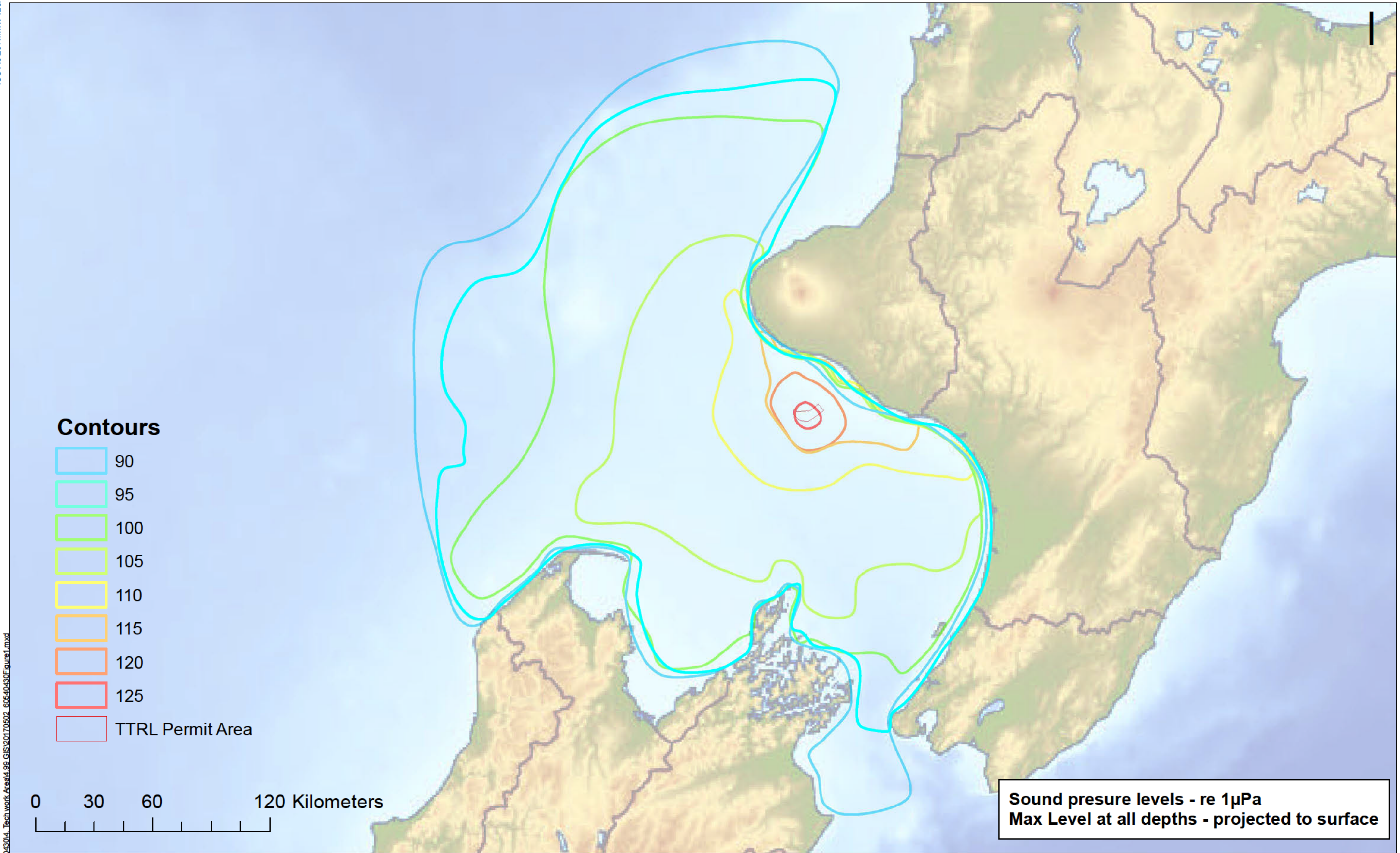

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PROJECT
TTRL - Underwater noise

CLIENT
Trans-Tasman Resources Limited

Map features depicted in terms of NZ WGS84S projection.

Data Sources:
LINZ NZ boundary and topography

PROJECT MANAGEMENT

Approved	DHumpheson	Date	020517
Checked		Date	
Designed		Date	
Drawn	DHumpheson	Date	020517

ISSUE/REVISION

Rev	Date	Description
A	02:05:17	Figure1

PROJECT NUMBER
60540430

SHEET TITLE
Sound presure levels
Crawler + IMV

MAP NUMBER
1

Last saved by: DARRAN.HUMPHESON (2017-05-02) Last Plotted: 2017-05-02
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